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EXAMINER

WOOD, WILLIAM H

ART UNIT

PAPER NUMBER

2124

DATE MAILED: 05/12/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/611,403

Applicant(s)

RINGSETH ET AL.

Examiner

William H. Wood

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 19 June 2001.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-21 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-21 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 06 July 2000 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 2 and 4.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other:

DETAILED ACTION

Claims 1-21 have been examined.

Information Disclosure Statement

1. The information disclosure statements (IDS) submitted on 06 July 2000 and 19 June 2001 were considered by the examiner.

Drawings

2. The drawings submitted were approved by the draft person.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

4. Claim 21 is rejected under 35 U.S.C. 102(a) as being anticipated by Richard Grimes, "Attribute Programming with Visual C++".

In regard to claim 21, Grimes disclosed the limitations:

- ♦ *In a computer system, a method of embedding debugging information in a definition language output file to facilitate debugging of an input file (page 2, third paragraph under section "How is Attribute Programming Managed in Visual C++"), the input file comprising constructs of definition language information embedded in programming language code (pages 4-5, code block), the method comprising:*

- ♦ *receiving by a programming language compiler an input file, the input file comprising constructs of definition language information embedded in programming language code (pages 4-5, code block);*
- ♦ *embedding by the programming language compiler debugging information in a definition language output file (page 3, second and third paragraph under figure), the definition language output file for subsequent processing by a definition language compiler (page 3, second and third paragraph under figure; page 2, third paragraph under section "How is Attribute Programming Managed in Visual C++"; MIDL), whereby the embedded debugging information associates errors raised by the definition language compiler with locations of embedded definition language constructs in the input file to facilitate debugging of the input file (page 3, second paragraph under figure).*

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claims 1-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Richard Grimes, "Attribute Programming with Visual C++" in view of Aho et al., "Compilers Principles, Techniques, and Tools" herein referred to as Grimes and Aho respectively.

In regard to claim 1, Grimes disclosed the limitations:

- ♦ *A computer readable medium having stored thereon a computer executable compiler system (page 2, first paragraph of section "How is Attribute Programming Managed in Visual C++"; page 3, second paragraph under figure; compiler system) that performs semantic analysis of definition language information (page 3, second paragraph under figure) embedded in programming language code in a file (page 2, first paragraph of section "How is Attribute Programming Managed in Visual C++", "interface" keyword; page 4-5, code block shows C++ and definition language code combined, notice "module" word), the compiler system comprising:*
 - ♦ *a file including programming language code having embedded therein definition language information (page 2, first paragraph of section "How is Attribute Programming Managed in Visual C++", "interface" keyword; page 4-5, code block shows C++ and definition language code combined, notice "module" word);*
 - ♦ *output ... based at least in part upon semantics of the embedded definition language information (page 3, second paragraph under figure).*

Grimes did not explicitly state the limitations *a front end module that separates a file into plural tokens; a converter module that converts the plural tokens into an intermediate representation; and a back end module that produces output code from the intermediate is representation.* Aho demonstrated that it was known at the time of invention to

develop compilers with a front end, a converter module and a back end (page 20, section "Front and Back Ends"). It would have been obvious to one of ordinary skill in the art at the time of invention to implement Grimes' system of C++ code and definition code with a compiler, which would generate executable code as found in Aho's teaching. This implementation would have been obvious because one of ordinary skill in the art would be motivated to provide a mechanism, which would allow source code to produce meaningful executable code.

In regard to claim 2, Grimes and Aho further disclosed the limitation *wherein the intermediate representation includes a symbol table and a parse tree that unifies representation of the programming language code and the embedded definition language information* (Aho: pages 11 and 40-48).

In regard to claim 3, Grimes and Aho further disclosed the limitation *wherein the symbol table includes plural entries for symbol names for the programming language code, and wherein at least one of the plural entries has an associated list of definition language attributes* (Aho: page 11).

In regard to claim 4, Grimes and Aho further disclosed the limitation *further comprising a definition language attribute provider that modifies the intermediate representation based upon the semantics of the embedded definition language information* (Grimes: pages 2-3, paragraph spanning pages; page 3, figure shown).

In regard to claim 5, Grimes and Aho further disclosed the limitation *further comprising an error checker module that checks for lexical, syntactic, and semantic errors in the file* (Aho: page 11).

In regard to claim 6, Grimes disclosed the limitations:

- ♦ *In a computer system, a computer executable compiler system that creates a unified programming language ... from a file comprising a mix of programming language constructs and interface definition language constructs (page 2-5), the compiler system comprising:*
 - ♦ *a file comprising a mix of programming language constructs and interface definition language constructs (page 4-5, code block);*

Grimes did not explicitly state the limitations *interface definition language parse tree; a front end module that separates a file into plural tokens; and a converter module that converts the plural tokens into an intermediate representation comprising a symbol table and a parse tree, wherein the symbol table includes plural entries for symbol names for the programming language constructs, at least one of the plural entries having an associated list of interface definition language attributes, and wherein the parse tree unifies representation of the programming language constructs and the interface definition language constructs*. Aho demonstrated that it was known at the time of invention to develop compilers with a front end, a converter module, a back end, a symbol table, and a parse tree (page 1-24 and 40-48). It would have been obvious to

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one of ordinary skill in the art at the time of invention to implement Grimes' system of C++ code and definition code with a compiler, which would generate executable code as found in Aho's teaching. This implementation would have been obvious because one of ordinary skill in the art would be motivated to provide a mechanism, which would allow source code to produce meaningful executable code. Finally, upon the above combination, it can be seen that symbol tables (provide by Aho), would have entries that contain a list of attributes associated with interface definition language (provided by Grimes).

In regard to claim 7, Grimes and Aho disclosed the limitation *wherein the front end module recognizes a delimiting character that distinguishes interface definition language tokens from programming language tokens* (Grimes: page 4-5, code block demonstrates "module" preceded by "[", a delimiting character).

In regard to claim 8, Grimes and Aho further disclosed the limitation *further comprising an error checker module that performs lexical and syntactic checks on the file* (Aho: page 11).

In regard to claim 9, Grimes disclosed the limitations:

- ♦ *A computer readable medium having stored thereon a data structure representing a unified interface definition language ... for a file having a*

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combination of programming language code and embedded interface

definition language information (page 2-5; notice Figure and code block)

Grimes did not explicitly state limitations concerning *programming language parse tree and symbol table*. Aho demonstrated that it was known at the time of invention to utilize parse trees and symbol tables (pages 11 and 40-48). It would have been obvious to one of ordinary skill in the art at the time of invention to implement Grime's interface definition language / programming language compiler with symbol tables and parse trees as appropriate for compiling such a combination as found in Aho's teaching. This implementation would have been obvious because one of ordinary skill in the art would be motivated to use common and well understood techniques for implementing compilers. Additionally the limitations below were discussed in previous claims:

- ♦ *a first data field storing data representing a symbol table that has plural entries, each of the plural entries corresponding to a symbol name for programming language code of a file having a combination of programming language code and embedded interface definition language information; at least one of the plural entries having an associated list of interface definition language attributes based upon the embedded interface definition language information (page 11); and*
- ♦ *a second data field storing data representing a parse tree, wherein the parse tree unifies representation of the programming language code and the embedded interface definition language information (page 40-48).*

In regard to claim 10, Grimes disclosed the limitations:

- ♦ *In a computer system, a method of creating a binary file from an input file that includes a mix of programming language constructs and definition language constructs (page 2, section "How is Attribute Programming Managed in Visual C++"; page 4-5, code block), the method comprising:*
 - ♦ *providing one or more input files, each input file comprising a mix of programming language constructs and definition language constructs (page 4-5, code block);*
 - ♦ *upon user initiation at compile time, creating a binary file from the one or more input files, wherein the creation of the binary file comprises (page 3, second paragraph under figure):*
 - ♦ *with a compiler, converting the one or more input files into one or more output code files that include fragments of definition language information (page 3, second paragraph under figure)*

Grimes did not explicitly teach *with a linker, generating a binary file from the one or more output code files*. Aho demonstrated that it was known at the time of invention to utilize linkage editors and loaders (page 19; section "Loaders and Link-Editors"). It would have been obvious to one of ordinary skill in the art at the time of invention to implement Grimes' system of compilation with a linkage editor as found in Aho's teaching. This implementation would have been obvious because one of ordinary skill in the art would be motivated to provide functionality, which is commonly used to execute code/programs and provide a final executable version of a program/code.

In regard to claim 11, Grimes and Aho further disclosed the limitations wherein the generating comprises:

- ♦ *extracting the fragments of definition language information from the one or more output code files* (obvious from Aho and especially considering Grimes: page 3, third paragraph under the figure);
- ♦ *passing the extracted fragments to the compiler* (obvious from Aho and especially considering Grimes: page 3, third paragraph under the figure);
- ♦ *generating by the compiler an intermediate definition language file* (obvious from Aho and especially considering Grimes: page 3, third paragraph under the figure);
- ♦ *based upon the intermediate definition language file, generating by a definition language compiler a type library file* (obvious from Aho and especially considering Grimes: page 3, third paragraph under the figure); *and*
- ♦ *producing the binary file based upon the one or more output code files and the type library file* (obvious from Aho and especially considering Grimes: page 3, third paragraph under the figure).

In regard to claim 12, Grimes and Aho further disclosed the limitations wherein the producing comprises:

- ♦ *embedding the type library file into a first intermediate resource file* (obvious from Aho and especially considering Grimes: page 3, third paragraph under the figure);
- ♦ *with a resource tool, generating a second intermediate resource file* (obvious from Aho and especially considering Grimes: page 3, third paragraph under the figure);
- ♦ *with a resource file combiner, combining the second intermediate resource file with one or more related resource files into a combined resource file* (obvious from Aho and especially considering Grimes: page 3, third paragraph under the figure); *and*
- ♦ *producing the binary file based upon the one or more output code files and the combined resource file* (obvious from Aho and especially considering Grimes: page 3, third paragraph under the figure).

In regard to claim 13, Grimes disclosed the limitations:

- ♦ *In a computer system, a method of deriving semantic meaning from definition language information embedded in programming language code in a file* (pages 2-3, section "How is Attribute Programming Managed in Visual C++", including the figure; pages 4-5, block of code); *the method comprising:*
 - ♦ *a file including definition language information embedded in programming language code* (pages 4-5, block of code)

- ♦ *representation based at least in part upon semantics of the embedded definition language information (page 3, figure)*

Grimes did not explicitly teach *separating a file into plural tokens; converting the plural tokens into an intermediate representation; and generating output code from the intermediate representation*. Aho demonstrated that it was known at the time of invention to provide compilers, which utilize separating files into tokens, converting tokens to an intermediate representation, and generating output code from an intermediate representation (pages 4-15; page 4 mentions tokens, page 12 mentions the intermediate representation). It would have been obvious to one of ordinary skill in the art at the time of invention to implement Grimes' programming language code embedded with definition language information compiler with the techniques found in Aho's teaching. This implementation would have been obvious because one of ordinary skill in the art would be motivated to develop a compiler based upon the well understood compiler theories and constructions taught by Aho for the purpose of building compilers.

In regard to claim 14, Grimes and Aho further disclosed the limitations wherein the converting comprises:

- ♦ *building a symbol table having plural entries for symbol names for the programming language code, at least one of the plural entries having an associated list of definition language attributes based upon the embedded definition language information (Aho: page 11); and*

- ♦ *building a parse tree that unifies representation of the programming language code and the embedded definition language information (Aho: page 40-48, section 2.4)*

In regard to claim 15, Grimes and Aho further disclosed the limitation *further comprising modifying the intermediate representation by a definition language attribute provider based upon the semantics of the embedded definition language information* (Grimes: page 3, figure shows attribute provider; page 2-3, paragraph spanning the pages describes the operations of attribute providers).

In regard to claim 16, Grimes disclosed the limitations:

- ♦ *A computer readable medium having stored thereon instructions for performing a method of creating a unified programming language (page 3, figure; page 4-5, code block) ... a file that includes definition language information embedded in programming language code (page 4-5, code block), the method comprising:*
 - ♦ *a file including definition language information embedded in programming language code (page 4-5, code block)*

Grimes did not explicitly state *definition language parse tree; separating a file into plural tokens; building a symbol table having plural entries for symbol names for the programming language code, at least one of the plural entries having an associated list of definition language attributes based upon the embedded definition language*

information; and building a parse tree that unifies representation of the embedded definition language information and the programming language code. Aho demonstrated that it was known at the time of invention to utilize compilers with various features, including: parse trees, breaking files into a plurality of tokens, building symbol tables (pages 10-11, 20, and 40-48). It would have been obvious to one of ordinary skill in the art at the time of invention to implement Grimes' definition language information and unified programming language compiler system with the tools necessary for compiler's to function as found in Aho's teaching. This implementation would have been obvious because one of ordinary skill in the art would be motivated to allow the compiler of Grimes to function as is commonly known for compilers. Upon see the obviousness of the two references in combination, one of ordinary skill in the art would also clearly see the limitations *symbol table having plural entries for symbol names for the programming language code, at least one of the plural entries having an associated list of definition language attributes based upon the embedded definition language information* (symbol table of Grimes would include both programming language and definition language in order for the compiler to correctly track identifiers that may occur) and *parse tree that unifies representation of the embedded definition language information and the programming language code* (parse tree in Grimes in order to correctly processing the tokens of a system that has programming language and definition language constructs).

In regard to claim 17, Grimes and Aho further disclosed the limitation *wherein the separating comprises recognizing a delimiting character that distinguishes definition language tokens from programming language tokens* (Grimes: page 4-5, code block; note “[” near the word “module”).

In regard to claim 18, Grimes disclosed the limitations:

- ♦ *A computer readable medium having stored thereon a computer executable compiler system that checks for errors in a file comprising a mix of definition language information and programming language code (page 2-5; figure and code block), the compiler system comprising:*

Grimes did not explicitly state the limitations *a front end module that separates a file into plural tokens and checking for errors; a converter module that converts the plural tokens into an intermediate representation and checking for errors (typically part of the front end); and a back end module that produces output code from the intermediate is representation*. Aho demonstrated that it was known at the time of invention to develop compilers with a front end, a converter module and a back end (page 20, section “Front and Back Ends” and additional details of functions performed by those elements of a compiler are found throughout chapter 1, pages 1-24). It would have been obvious to one of ordinary skill in the art at the time of invention to implement Grimes’ system of C++ code and definition code with a compiler, which would generate executable code as found in Aho’s teaching. This implementation would have been obvious because

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one of ordinary skill in the art would be motivated to provide a mechanism, which would allow source code to produce meaningful executable code.

In regard to claim 19, Grimes and Aho did not explicitly state *wherein the converter module further checks for semantic errors between the definition language information and the programming language code*. Aho demonstrated that it was known at the time of invention to check for errors at various phases (page 11, section "Error Detection and Reporting"). Grimes demonstrated it was known to implement compilers with both definition language information and programming language information. It would have been obvious to one of ordinary skill in the art at the time of invention to implement the Grimes Aho compiler system with error checking between the definition language information and the programming code as suggested by their own teaching. The converter modules would check for errors just like all other phases/modules/sections. Furthermore, semantic errors are related to the converter module as it is related to language representation to begin with. This implementation would have been obvious because one of ordinary skill in the art would be motivated to use known compiler techniques and reduce errors.

In regard to claim 20, Grimes disclosed the limitations:

- ♦ *In a computer system having a programming language compiler that generates output code based upon programming language source code* (page 2-3, section "How is Attribute Programming Managed in Visual C++"),

the programming language compiler including a compiler state (page 3, Figure shown), an improvement comprising:

- ♦ *modifying the programming language compiler to recognize constructs of interface definition language information embedded within programming language source code (pages 4-5, block of code showing definition language embedded);*
- ♦ *modifying the programming language compiler to expose the compiler state to one or more interface definition language attribute providers (page 3, figure shown);*
- ♦ *modifying the programming language compiler to allow manipulation of the elements of the compiler by the one or more interface definition language attribute providers based upon the semantics of the embedded interface definition language information (page 3, figure shown; pages 2-3, paragraph spanning the pages)*

Grimes did not explicitly state the limitations of a symbol table and a parse tree. Aho demonstrated that it was known at the time of invention to develop compilers with a symbol table and a parse tree (page 10, 11, 40-48). It would have been obvious to one of ordinary skill in the art at the time of invention to implement Grimes' system of embedded definition code within a programming language with a compiler, which would generate executable code as found in Aho's teaching. This implementation would have been obvious because one of ordinary skill in the art would be motivated by the

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commonly understood techniques of allowing source code to produce meaningful executable code.

Conclusion Remarks

7. *Examiner's Special Note 1:* Claims 1-21 could also be rejected with single reference Aho in that the phrase "definition language information" could broadly be interpreted as an abstract class. Under this definition an abstract class defines the look of an upcoming concrete class. Clearly, one compiler will interpret and compile object code for both the "definition language information" (abstract class) and the programming language (concrete class).

8. *Examiner's Special Note 2:* Claims 1-21 could also be rejected by interpreting "definition language information" as the stub or skeletal code produced by a standard IDL compiler. Under this definition a single compiler will interpret and compile the stub code along with the programming code (implementation written by programmer) as a normal operation. Key to this interpretation is the broad meaning of the word "information", which could be anything and any step in the processing of IDL.

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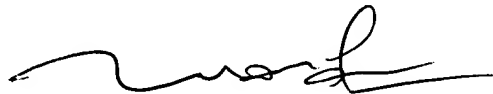
Correspondence Information

Any inquiry concerning this communication or earlier communications from the examiner should be directed to William H. Wood whose telephone number is (703)305-3305. The examiner can normally be reached 7:30am - 5:00pm Monday thru Thursday and 7:30am - 4:00pm every other Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kakali Chaki can be reached on (703)305-9662. The fax phone numbers for the organization where this application or proceeding is assigned are (703)746-7239 for regular communications and (703)746-7238 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703)305-3900.

William H. Wood
May 5, 2003



**TUAN Q. DAM
PRIMARY EXAMINER**